

# (12) UK Patent Application (19) GB (11) 2 321 706 (13) A

(43) Date of A Publication 05.08.1998

(21) Application No 9801205.7

(22) Date of Filing 20.01.1998

(30) Priority Data

(31) 29701586 (32) 31.01.1997 (33) DE

(71) Applicant(s)

**Mannesmann VDO AG**  
**Kruppstrasse 105, D-60388, Frankfurt,**  
**Federal Republic of Germany**

(72) Inventor(s)

**Benjamin Säger**

(74) Agent and/or Address for Service

**Brookes & Martin**  
**High Holborn House, 52-54 High Holborn, LONDON,**  
**WC1V 6SE, United Kingdom**

(51) INT CL<sup>6</sup>  
**G07C 5/12**

(52) UK CL (Edition P )  
**G1J J2C1A**

(56) Documents Cited

**EP 0709683 A1 EP 0309854 A2 US 4903044 A**

(58) Field of Search

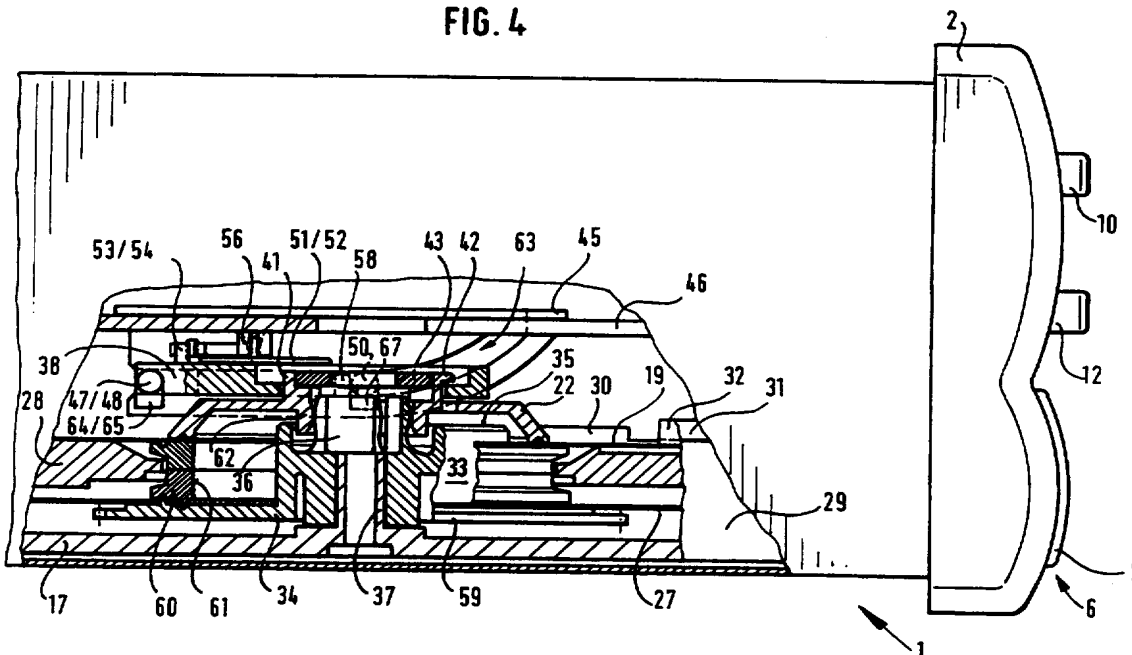
**UK CL (Edition P ) G1J**  
**INT CL<sup>6</sup> G01D 9/00 15/32 , G01P 1/14 , G07C 5/12**  
**On-line : WPI**

(54) Abstract Title

**Arrangement for fixing charts in tachographs**

(57) An arrangement for fixing recording charts 19, 27 in tachograph with a flat, cuboid casing 1 equipped with a drawer 6 which contains a support (34) allocated to the recording charts and running gear driving the support 34 in real time. A chart 19 is automatically fixed on the support 34 during closure of the drawer 6 by a fixing element 22 which is held slackly and rotatably on a carriage 38 which is movable by means of the drawer 6 and is guided in curved tracks. The carriage 38 is entrained indirectly via the fixing element 22 in that a coupling peg 36 is formed concentrically to a centring and entraining pin 33 for the charts 19 on the support 34. The peg 36 consists of outwardly convexly shaped ring segments which cooperate with the interior of a coupling ring 62 formed on the fixing element 22. As the drawer 6 continues moving in the closing direction, the coupling ring 62 engages on the coupling peg 36.

**FIG. 4**



**GB 2 321 706 A**



FIG. 3

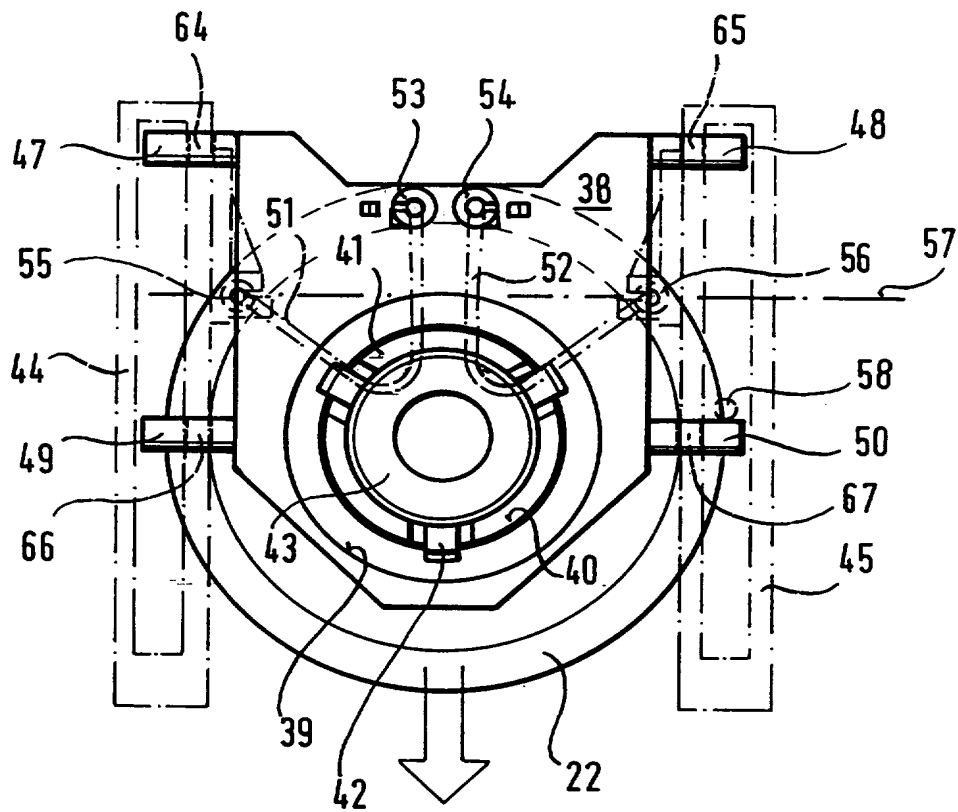
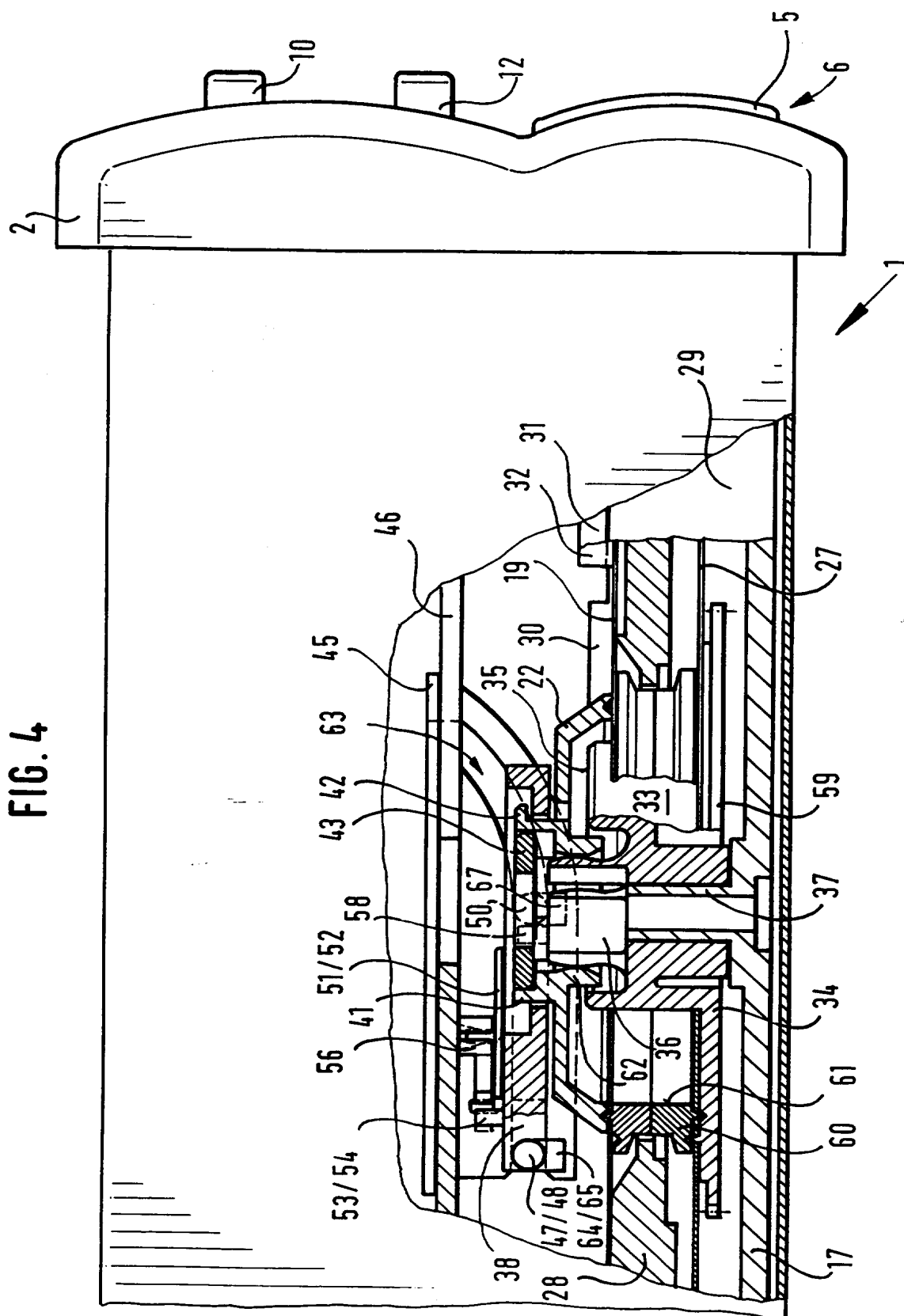
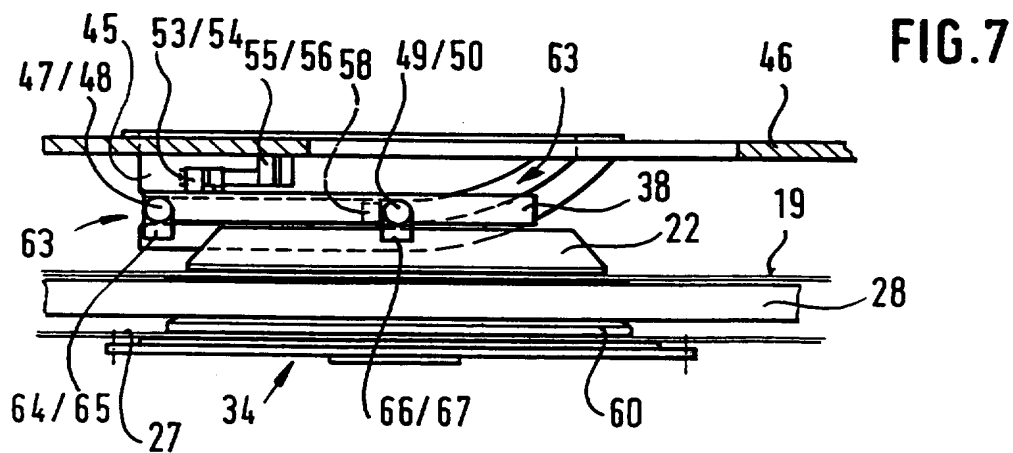
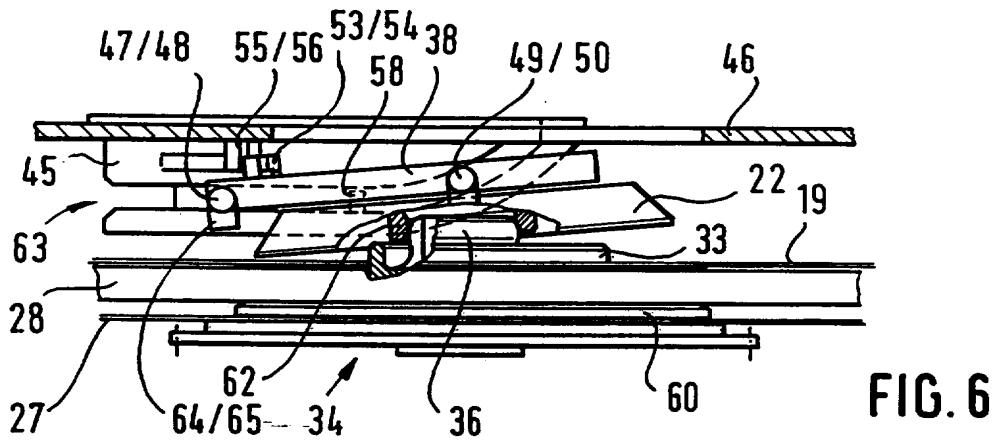
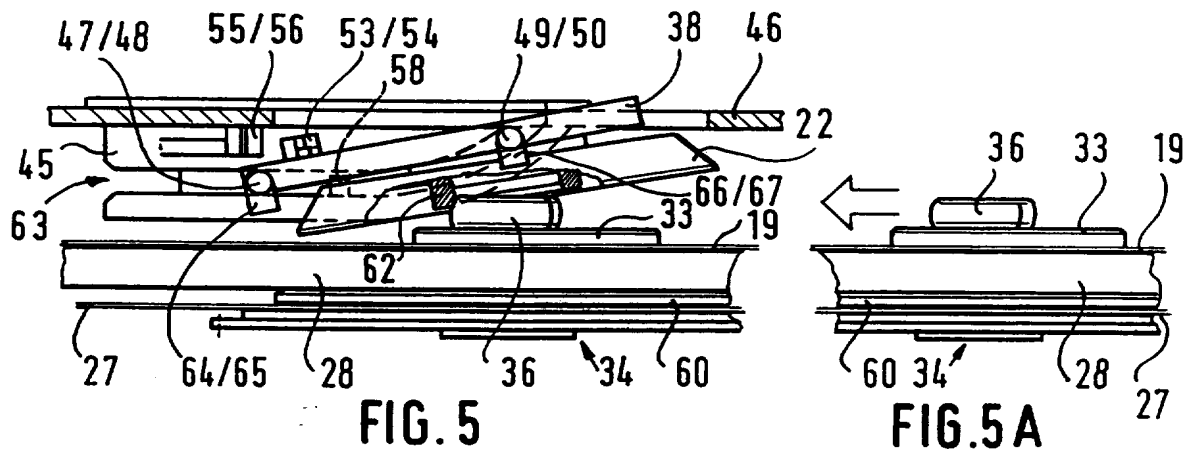


FIG. 4





**ARRANGEMENTS FOR FIXING CHARTS IN TACHOGRAPHS**

The invention relates to an arrangement for fixing charts in tachographs.

It is known from DE-AS 24 33 745, to provide a tachograph with a cover which can be hinged open at the front, to expose a bell-shaped chart fixing element which is held slackly in a support which separates the casing part of the tachograph containing the measuring and recording elements from the hinged cover. The tachograph cover contains, among other things, running gear which drives the support for the chart. Its rear wall which is directed into the interior of the tachograph and on which the support and a centring and entraining pin moulded thereon are accessible acts as a guide surface and recording substrate for the chart. On closure of the cover, the fixing element engages with the centring and entraining pin designed for this purpose and axially secures the chart on the support. With this configuration, there is sufficient space for the combining of the centring and entraining pin and the fixing element. Actual engagement occurs in practice, as the cover is pivoted in, by axial joining of the fixing element to the centring and entraining pin, more specifically directly before the cover is closed. In other words, the joining of the centring and entraining pin and fixing element takes place at right angles to the recording plane.

An automatically-acting fixing device for charts according to DE-AS 24 33 745 is not suitable for a tachograph without a hinged cover and of the type which is designed for general use, in other words for installation in vehicles where it is not compulsory, or for spatially more desirable installation in the driver's reach and of which the casing is to have the smallest

possible overall height. In this case, the space between the plane of movement of the support or the front face of the centring and entraining pin and a mounting plate which carries various functional modules, in particular the recording elements, is extremely small. Bulging of the chart in the central region and therefore release of torque in the holding orifice of the chart cannot be achieved with fingers which are moulded on the mounting plate and surround the centring and entraining pin in the form of a semicircle in the closed position of the drawer, as shown in DE-A 44 38 926. There is also a risk that an already slightly bulging chart will strike the fingers on closure of the drawer.

It is conceivable to mount a fixing element suitably axially displaceably in the mounting plate and to raise and lower it by a motor, controlled by the drawer or by the release signal for opening the drawer. However, a solution of this type requires space on the side of the mounting plate remote from the drawer and necessitates excessively high production costs for the desired purpose.

An object of the present invention is to provide, in a tachograph of the type in which a support is driven by running gear and is provided with a centring and entraining pin for the recording charts and the support is carried by a slidable drawer in the tachograph casing, an arrangement for fixing charts on entraining means which automatically comes into effect on actuation of the drawer and can be produced with minimum expenditure.

In one aspect the invention provides an arrangement for fixing charts on a support of a tachograph with a flat cuboidal housing equipped with a drawer which carries the support

which is driven with correct timing by drive means and is provided with a centring and entraining pin; said arrangement having a carriage guided in the casing and movable by the drawer and a fixing element which is non-positively connected to the support when the drawer is closed and which is held relatively slackly and rotatably on the carriage.

Preferably the carriage is a flat plate guided in a curved track which is substantially non-parallel to the plane of movement of the drawer. The carriage is located in a position parallel to the plane of movement of the drawer in one end position when the drawer is closed and in a position oblique to the plane of movement of the drawer in another end position when the drawer is open. On closure of the drawer the carriage is entrained and the fixing element engages on the support. The fixing element is tilted from the support when the drawer is opened.

A coupling peg which is preferably convex in shape, e.g. with ring segments, and projects beyond the centring and entraining pin can be formed on the support concentrically to the centring and entraining pin. A coupling ring is allocated to the coupling peg and provided on the fixing element. The ring is preferably bell-shaped and overlaps the centring and entraining pin.

Springs may hold the carriage in the end positions. A mounting plate of the tachograph housing may have cheeks which act as guides for one or more bearing journals on the carriage.



The special effect afforded by the invention resides, in particular, in the fact that the desired function can be fulfilled with a space with a particularly lower overall height. For example, the distance between the underside of the mounting plate and the end face of the centring and entraining pin moved by the drawer is less than 10mm.

The fixing element is best held rotatably on the carriage by means of several locking elements to be located in a precisely defined position when the drawer is open. This guarantees that the carriage will invariably be entrained by the same displacement path on closure of the drawer. The coupling peg and the coupling ring cooperate directly with one another, ensuring tilt-free engagement or slipping of the fixing element on the coupling peg. It should also be emphasised that the design of the coupling means, in particular of the coupling ring which is moulded on the fixing element and is closed in design, but also of the slit but substantially closed coupling peg invariably afford identical conditions, in other words independence of position during entrainment of the carriage and during engagement of the fixing element on the coupling peg, but also allow smooth release during opening of the drawer. It is also mentioned that the height of the carriage preferably substantially corresponds to the diameter of a bearing journal moulded on the carriage. The carriage is therefore particularly flat in design. The cheeks with the guides hollowed in them and allocated to the carriage can be formed easily on the mounting plate by outset injection moulding.

An embodiment of the invention will now be described in detail hereinafter by way of example only, with reference to the accompanying drawings wherein:

Figure 1 is a front view of a tachograph incorporating an arrangement in accordance with the invention;

Figure 2 is a plan view of the tachograph according to Figure 1 with the drawer open;

Figure 3 is a plan view of the carriage and of the fixing element connected to the carriage and of a schematic allocation of the cheeks guiding the carriage and the torsion springs;

Figure 4 is a partially broken away side view of the tachograph shown in Figures 1 to 3;

Figure 5 shows an operating position of the arrangement in accordance with the invention during closure of the drawer;

Figure 5A shows the position of the centring and entraining pin and of the coupling peg with respect to the operating position in Figure 5 when the drawer is completely open;

Figure 6 shows an intermediate position of the arrangement, and

Figure 7 shows an operating position of the arrangement when the drawer is closed.

As shown in Figures 1 and 2, a tachograph comprises a cuboidal housing 1 with a front wall 2 having an aperture 3 for accommodating a display 4. Reference numeral 5 designates the front screen of a slidable drawer 6 guided in the housing 1 in which a chart 19 is mounted.

various control buttons 7,8,9,10,11 and 12 are provided on the front wall 2. The buttons 7 and 8 and the button 9 described as a menu button are allocated to the driver or the co-driver for selecting at least the most important work time data. The buttons 10 and 11 are used for leafing to and fro in the respectively selected records, and the button 12 is provided for releasing the drawer 6. Access to a diagnostic socket is prevented by a seal designated by 13. For the sake of completeness, it is mentioned that, as also shown in Figure 2, the illustrated tachograph is designed as an in-built unit and the drawer 6, which is shown in its open position in Figure 2, is mounted on guide rails 14,15 in the housing 1. Reference numeral 16 designates the rear part of the drawer 6 which also engages with the guide rails 14,15 when the drawer 6 is open and contains, among other things, an essential part of the drive means for driving the charts.

It can also be seen from Figure 2 that a recess 18 is formed in a base 17 of the drawer 6 to simplify removal of the inserted chart 19. In the illustration of the chart 19, the conventional network used for interpreting the recordings has been dispensed with, apart from the divisions into hours 20, for the sake of simplicity. A line designated by 21 is to symbolise the boundary of the internal field of the chart 19 within which recording cannot take place and in which a fixing element 22 (Figure 4) can therefore be accommodated. Projections 23, 24 in which slots 25, 26 are formed are also moulded on the drawer 6. They are used to secure the drawer 6 in the closed state. The illustrated tachograph is equipped to hold two charts 19 and 27 (Figure 4) which are superimposed with spacing. Figure 2 shows a plate 28 which is pivotally mounted in the drawer 6. The plate 28 serves as a recording support for the chart 19

and separates the chart 19 from the second chart 27 allocated to the co-driver. The plate 28 is supported on the lateral walls 29, 30 of the drawer 6 by means of moulded lugs 31, 32.

In Figure 2, the charts 19,27 are held on a non-circular centring and entraining pin 33 which is formed on a support 34 (Figure 4). The projecting portion of the centring and entraining pin 33 is designated by 35. A coupling peg 36 consisting of outwardly convexly shaped ring segments is also formed on the support 34 concentrically to the central part of the centring and entraining pin 33, in such a way that it projects beyond the end region 35 of the centring and entraining pin 33. Reference numeral 37 designates a bearing journal which is moulded on the base 17 of the drawer 6, is hollow in design and is allocated to the support 34.

The plan view in Figure 3 shows, as a module, the allocation of the fixing element 22 to a carriage 38 and the contours of the guide means allocated to the carriage 38 and of the spring elements which bring about the tilt fixing function of the carriage 38. An orifice 40 which is provided with a depression 39 and in which a collar 41 moulded on the fixing element 22 engages is formed in the carriage 38 designed as a flat, relatively thin plate. Several bolts, one of which is designated by 42, are cut free on the collar 41 and engage in the depression 39. The pegs are prevented from springing back, for example during removal of the fixing element 22 from the coupling peg 36, by a securing ring 43 inserted into the carriage 38 after engagement of the fixing element 22. Reference numerals 44 and 45 designate cheeks which are injection moulded on a mounting plate 46 (Figure 4) of the tachograph. The cheeks 44,47 which are merely shown schematically in Figure 3 serve to guide the carriage 38 with the aid of bearing journals 47, 48, 49 and 50 formed thereon. Two v-shaped torsion springs 51 and 52,

are inserted on the mounting plate 46 during mounting of the carriage/fixing element module and are used to secure the carriage 38 in the respective end positions. The free ends of the legs of the torsion springs 51, 52 not shown are bent at right angles and engage, stub-shafts in bearings 53, 54 or 55, 56 moulded, on the one hand, on the carriage 38 and on the other hand on the cheeks 44, 45. During movement of the carriage 38 in the direction of the arrow and in the opposite direction, in other words during entrainment of the carriage 38 by the drawer 6, the torsion springs 51, 52 pivot substantially parallel to the surface of the carriage 38, and release into the direction of movement of the drawer 6, as a tilting motion triggered in each case on attainment of a tilt line 57.

The position of the carriage 38 shown in Figure 3 on a stop pin 58 allocated to the mounting plate 46 or the cheek 45 is achieved when the drawer 6 is closed. In this position the fixing element 22 is engaged on the coupling peg 36 and revolves with the support 34 driven in real time. Play exists on all sides between the pegs 42 and the collar 41 of the fixing element 22 and the carriage 38. The partially broken away side view in Figure 4 shows the co-operating components in the above-described arrangement. It also shows that the support 34 is provided with toothing 59 by means of which it is mechanically connected to a gear wheel (not shown) of the drive. It can also be seen that a two-part ring 60 is held slackly in the plate 28. The ring 60 acts as a spacer for the charts 19 and 27 and revolves with the support 34 when the fixing element 22 is engaged on the coupling peg 36. The orifice 61 of the ring 60 is dimensioned such that the ring 60 can pivot via the centring and entraining pin 33 in the position shown in Figure 6 when the plate 28 is folded up, as necessary for exchanging the chart 27 therebelow.

With regard to the engagement of the fixing element 22 on the coupling peg 36 which is radially elastic in design owing to the ring segments, it is also mentioned that the fixing element 22 is provided with a coupling ring 62 of which the internal wall is undercut to match the coupling peg 36 so the coupling peg 36 exerts an axial force via the fixing element 22 on the ring 60 and the charts 19, 27. It is also pointed out that a guide 63 allocated to the bearing journal 47/49 or 48/50 is freely moulded in each cheek 44, 45 by injection moulding, more specifically by appropriate counter-immersion. Reference numerals 64, 65, 66 and 67 designate flange elements which are moulded on each bearing journal 47, 48, 49, 50 and serve for the lateral guidance of the carriage 38. It can also be seen from Figure 4 that the guidance of the carriage 38 is not parallel to the plane of movement of the drawer 6 but has a course which is such that the carriage 38 is oblique to the plane of movement of the drawer 6 in one end position, in other words when the drawer 6 is open. In this end position, the mounting plate 46 acts as a stop for the bearing journal 49/50, and the carriage 38 rests on the mounting plate 46 under the influence of the torsion springs 51, 52 so the position of the carriage 38 and of the fixing element 22 is defined exactly for entrainment thereof during closure of the drawer 6. Figure 5 shows this position of the carriage 38 in which the torsion springs 51, 52 have not been illustrated for the sake of clarity. Figure 5 also shows an operating position in which the entrainment of the carriage 38 begins during closure of the drawer 6. In other words, the coupling peg 36 rests on the coupling ring 62 of the fixing element 22 and the play between the fixing element 22 and the carriage 38 is compensated in the entrainment direction. For comparison purposes, Figure 5A shows the position of the drawer 6, the centring and

entraining pin 33 and the coupling peg 36 in which the exchange of the charts 19 and 27 and the pivoting of the plate 28 required for this purpose can take place.

Figure 6 shows the arrangement according to the invention in an intermediate position in which the fixing element 22 or the coupling ring 62 is slipped on the coupling peg 36 but is not engaged therewith.

The position of the carriage 38 shown in Figure 7 corresponds to that in Figure 4, in other words the drawer 6 is closed, the fixing process completed and the fixing element 22 revolves with the support 34, more specifically without friction relative to its mounting in the carriage 38.

**Claims**

1. In or for a tachograph with a flat cuboidal housing equipped with a displaceable drawer capable of adopting open and closed positions which carries a support which is driven with correct timing by drive means and is provided with a centring and entraining pin; arrangement for fixing charts on the support and permitting exchanging of the charts; said arrangement comprising a carriage (38) guided in the housing (1) and movable by the drawer (6) and a fixing element (22) which is non-positively connected to the support (34) when the drawer (6) is closed and which is held slackly relatively and rotatably on the carriage (38).
2. An arrangement according to claim 1, wherein the carriage (38) is guided for movement in a direction which is substantially non-parallel to the plane of movement of the drawer (6), and is locatable in a position parallel to the plane of movement of the drawer (6) in one end position when the drawer (6) is closed and in a position oblique to the plane of movement of the drawer (6) in another end position when the drawer (6), is open so that when the drawer (6) is closed the carriage (38) is entrained and the fixing element (22) engages on the support (34) when the drawer (6) is opened and the fixing element (22) is tilted away from the support (34)
3. An arrangement according to claim 1 or 2, and further comprising a coupling peg (36) projecting beyond an end region (35) of the centring and entraining pin (33) and formed on the support (34) concentrically to the centring and entraining pin (33) and a coupling ring (62)



allocated to the coupling peg (36) is hollowed on the fixing element (22) and overlaps the centring and entraining pin (33).

4. An arrangement according to claim 3, wherein the coupling peg (36) is made up of ring segments which are externally convexly shaped.
5. An arrangement according to claim 3 or 4, wherein the coupling peg (36) co-operates with the coupling ring (62) of the fixing element (22) so that during closure of the drawer (6) the carriage (38) is entrained from its end position.
6. An arrangement according to any one of claims 1 to 5 and further comprising a bistable tilt/fixing device for securing the carriage (38) in its end positions.
7. An arrangement according to claim 6, wherein the tilt/fixing device comprises at least one torsion spring (51,52) of which one leg is held on the carriage (38) and the other leg is held stationarily.
8. An arrangement according to any one of claims 1 to 7, and further comprising bearing journals (47,48,49,50) moulded on the carriage (38) and co-operating with cheeks (44,45) with guides (63) formed on a fixed mounting plate (46).

9. An arrangement according to claim 8, wherein flange elements (64,65,66,67) are moulded on the bearing journals (47,48,49,50) between the cheeks (44,45) for the lateral guidance of the carriage (38).
10. Arrangement according to any one of claims 1 to 9, wherein the carriage (38) is a flat plate, the fixing element (22) is held in the carriage (38) by means of pegs (42) and a securing element (43) is provided by means of which the pegs (42) can be locked after connection of the fixing element (22) and the carriage (38).
11. An arrangement substantially as herein described with reference to and as illustrated in the accompanying drawings.
12. A tachograph incorporating a fixing arrangement according to any one of claims 1 to 11, and/or substantially as described with reference to, and as illustrated in the accompanying drawings



**Application No:** GB 9801205.7  
**Claims searched:** ALL

**Examiner:** Michael Walker  
**Date of search:** 20 April 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.P): G1J

Int CI (Ed.6): G01D 9/00, 15/32; G01P 1/14; G07C 5/12

Other: On-line : WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
Y	EP 0709683 A1 (MANNESMANN--) see abstract	1
Y	EP 0309854 A2 (MANNESMANN--) see abstract	1
Y	US 4903044 (KNAUER et al.) Eg.col.7, ll.24-40	1

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
E Patent document published on or after, but with priority date earlier than, the filing date of this application.

**PUB-NO:** GB002321706A  
**DOCUMENT-IDENTIFIER:** GB 2321706 A  
**TITLE:** Arrangement for fixing charts in  
tachographs  
**PUBN-DATE:** August 5, 1998

**INVENTOR-INFORMATION:**

<b>NAME</b>	<b>COUNTRY</b>
SAEGER, BENJAMIN	N/A

**ASSIGNEE-INFORMATION:**

<b>NAME</b>	<b>COUNTRY</b>
MANNESMANN VDO AG	DE

**APPL-NO:** GB09801205  
**APPL-DATE:** January 20, 1998

**PRIORITY-DATA:** DE29701586U (January 31, 1997)

**INT-CL (IPC):** G07C005/12

**EUR-CL (EPC):** G01D015/32 , G01P001/12 , G07C005/12 ,  
G07C007/00